

# Focus on Research



NHDOT

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## NHDOT Research Showcase & Poster Session

On January 4<sup>th</sup>, 2006 the Bureau of Materials & Research hosted a Research Showcase & Poster Session in the main lobby conference room of the John O. Morton Building. The Showcase concept was developed to increase awareness of the resources available through the research program and to highlight some of the successful projects that have benefited the Department in recent years.

Over 20 in-house and contracted studies were displayed using posters, videos and other presentation tools. Researchers were on hand to discuss their work and answer questions from participants. The event was well attended by NHDOT personnel and included visitors from a number of municipalities, consulting firms, other agencies and organizations. "I had no idea we were doing so many things" was an oft-heard remark from DOT personnel, providing a measure of success for the goals of the

event and prompting some to consider the showcase concept as a way to highlight other important Department initiatives.

**On the Road...**Posters created for the Showcase have been getting additional mileage at transportation events and conferences both in the region and nationwide. Nearly the entire collection of posters was displayed at the annual American Council of Engineering Companies of New Hampshire (ACEC-NH) Technology Transfer conference in Concord April 13<sup>th</sup>. Selected posters have made their way to the 2006 TRB Annual Meeting in Washington DC, the 2006 Region I LTAP meeting in Portsmouth, NH, and other venues. Plans are underway to include a series of posters at the Department's traveling state fair exhibit, various Maintenance Districts, and the annual NHDOT Construction School.



Research was the topic of the day at the J.O. Morton Building on January 4th

## NHDOT Research Advisory Council Prioritizes New Problem Statements

The NHDOT Research Advisory Council (RAC) plays a key role in evaluating problem statements submitted to the Bureau of Materials & Research. The RAC consists primarily of Bureau Administrators who meet once a year to determine the priority and ranking of potential projects. Members are chosen so that both highway

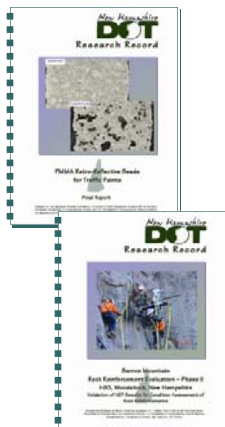
and non-highway issues are considered. A RAC member or other Department manager is required to endorse submissions submitted from outside NHDOT. Alan Rawson, the Administrator of the Bureau of Materials and Research, is the Chairman of the RAC.

This year's meeting was held at the Society for the Protection

of New Hampshire Forests' Conservation Center in Concord. Following an initial literature search and screening process conducted by the Research Section, eleven new projects were presented to RAC. Presenters from various NHDOT Bureaus, as well as from outside NHDOT, outlined

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## Completed Research



## Two NHDOT-led Pooled-Fund Study Reports Published

The Transportation Pooled Fund (TPF) program ([www.pooledfund.org](http://www.pooledfund.org)) enables State departments of transportation (DOTs) and the Federal Highway Administration (FHWA) to leverage resources and undertake large-scale research projects of mutual interest while avoiding duplication of effort. Since 1993, the Department has participated in more than 30 studies through the program, at a total cost of approximately \$1.2M. Final reports from two NHDOT-led studies were recently published

and distributed:

- PMMA Retro-Reflective Beads for Traffic Paints (Project TPF-5(024), sponsored by NH, CO, CT, FL, IN, MD, ME, NJ, VT).
- Barron Mt. Rock Reinforcement Evaluation Phase II, Validation of NDT Results for Condition Assessment of Rock Reinforcements (Project TPF-5(096), sponsored by NH, NY, CT).

Other Completed NHDOT Projects:

- Mitigation of Alkali-Silica Reactivity in New Concrete in New Hampshire – Phase 2, Minimum Amounts of Admixture(s) Needed to Significantly Minimize ASR
- Development Of A Geotechnical GIS For Subsurface Characterization With 3D Modeling Capabilities

## NHDOT Joins Maintenance Decision Support System (MDSS) Pooled Fund Study

NHDOT has joined a pooled fund study with eight other states to develop and implement a Maintenance Decision Support System (MDSS). The project has been ongoing since 2002; NH is the newest participant. The MDSS receives input

from RWIS stations, forecasting services, vehicle sensors and visual observations and provides output to winter maintenance personnel in the form of road surface behavior predictions and feasible/preferred treatments, relative to available

resources. An MDSS was identified as a component of the Department's salt reduction effort in the FEIS for the I-93 Salem-Manchester project. South Dakota DOT is the lead state for the project.

(TPF-5(054))



## New Research

### Petroscope Evaluation

NHDOT is participating in the evaluation of an instrument that provides automatic measurement of coarse aggregate properties such as size, shape, and composition; and related software that models engineering properties like gradation, specific gravity, wear, density and mineralogy. The Petroscope device, manufactured by PetroModel of Iceland, is primarily designed for laboratory use at this time. The evaluation team includes

representatives from FHWA, NHDOT, UNH and the aggregate industry (Manchester Sand and Gravel). Evaluation results are scheduled for publication by Late 2007.



SEE PAGE 4 FOR NEW PROJECT PRIORITIES FROM THE APRIL 2006 MEETING OF THE NHDOT RESEARCH ADVISORY COUNCIL

## Evaluation of an Automated Bridge Anti-Icing System

The New Hampshire DOT and Vermont AOT are moving forward with a joint research project to evaluate the effectiveness of a fixed automatic spray technology (FAST) system. FAST systems combine pavement and weather sensors with spray nozzles in the roadway to preemptively apply anti-icing chemicals before dangerous conditions develop. Expected benefits include quicker response to slippery conditions, fewer maintenance crew dispatches, and reduced motor vehicle accidents.

The system is being supplied through a contract with Boschung America. The system will be installed during the 2006 construction season by NHDOT and VTrans forces on the southbound structure carrying Interstate I-89 over the Connecticut River between Lebanon, NH and White River Junction, VT.

A two-year evaluation is planned. Benefits will be measured by evaluating the costs of operation, personnel and equipment, and by evaluating system performance for prediction and treatment of

icing conditions. An assessment of the potential effects of potassium acetate chemical on the concrete structure is also planned. NHDOT will operate and maintain the system once constructed.



## Field Installation Updates



### Alternative Pavements for Snowmobile Crossings -

Two products were installed at trail crossings in Errol, Groveton and Rumney in 2005 to evaluate ease of placement and durability characteristics alongside conventional HMA pavement.

Damage and wear is being correlated to sled traffic volumes obtained by remote

infrared monitors. After one winter season, the machine-applied thermoplastic product appears to be the superior performer. The product provides a relatively smooth ride for motorists, and easily matches the existing shape of the surface. The test sections will be monitored for one additional winter season.

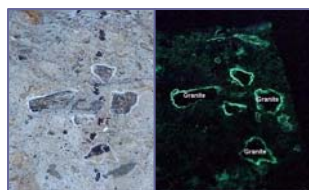
### Preparation of Shoulder Rumble Strips before Overlayment -

This research seeks to identify a cost effective and efficient method for treating rumble strips prior

to overlay, along with a corresponding specification and guideline. Four preparation scenarios were selected and incorporated into 500-foot segments of northbound I-89 in Enfield prior to receiving a 1.5-inch overlay in July 2005. The test areas will be monitored both before and after rumble strips are re-installed at the same locations.



## Implementation Corner



### ASR Research Leads to Change in NHDOT Concrete Specifications

Alkali-Silica Reactivity (ASR) has become a major concern related to long term durability of Portland cement concrete (PCC) in New Hampshire. Research completed by NHDOT in 2002 showed that 25% of the state's PCC aggregate sources are potentially reactive. In addition, 40% of existing structures tested during the study exhibited some level of ASR activity.

Phase II of the research, completed in 2005, demonstrated various chemical and mineral admixtures that control ASR in new concrete, even with the most reactive NH aggregates. NHDOT specifications were revised to require 50% slag or 25% fly ash. Alternative admixtures are allowed if test results show acceptable mitigation of ASR.

## Ongoing Research

*The great tragedy of science - the slaying of a beautiful hypothesis by an ugly fact.*

**- T H Huxley**

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**NHDOT RAC (cont'd from Page 1)**

the problem and described the need and benefit of the proposed research. Projects were prioritized and ranked by the voting RAC members. The FY 2007 SPR Part II work program will be formulated by Materials & Research staff based on the RAC rankings and available funds, and the proposed program will be presented to the Commissioner's Office and FHWA for approval.



**TOP RATED PROBLEM STATEMENTS from  
2006 NHDOT RESEARCH ADVISORY COUNCIL  
MEETING (in order):**

- Improving the Drying Time of Traffic Paint
- Flood Flow Frequency of NH Streams
- RWIS System Validation and Assessment
- Performance of Warm Mix Asphalt
- In-Service Performance Monitoring of a CFRP Reinforced HPC Bridge Deck
- On-board Vehicle Sensors for High-Resolution Weather & Road Conditions
- Spring Thaw Predictor & Real-Time Spring Load Restriction Methodology
- Airport Preservation Study at Hampton Airport

**Research Focus Groups Formed**

The Research Section has begun to organize Focus Groups to more effectively identify research needs. Two disciplines that have traditionally been underrepresented in the research program were chosen to pilot the initiative. Inaugural meetings were held for both groups in March 2006:

- Administration
  - ⇒ Human Resources, Finance, Contracts, Legal, Administration
- Multimodal
  - ⇒ Aeronautics, Rail & Transit, Bike/Ped, Planning & Community Assistance

Using brainstorming techniques, a number of problems in need of a research solution were identified. Some of the identified issues have already been resolved through targeted literature searches of ongoing or completed research. One Aeronautics problem statement was presented to the NHDOT RAC for consideration in April.

**WHAT'S YOUR PROBLEM?**